

REMARKS**Status of the Claims**

Claims 1, 2, 4, 8, 13, and 15 have been amended to more clearly recite the present invention. In particular, the claims have been amended to (1) replace the term "tertiary material" with "tertiary metal", (2) recite that the tertiary metal can be of a type which results in the formation of a liquid phase at a temperature that is lower than a two-element eutectic temperature between the Ti material and the Cu material, and (3) recite heating of the Ti material and the Cu material is to a temperature where solid and liquid coexist and lower than a two-element eutectic temperature of the Ti material and the Cu material. Support for these amendments can be found, for example, in the claims as originally filed. Applicants respectfully submit that these amendments do not narrow the scope of the claims.

Previously withdrawn claims 9-12 have been canceled without prejudice or disclaimer. Claims 16-20 have been added, support for which can be found, for example, on pages 11-13 of the specification (Embodiments 1, 2 and 3). No new matter has been added.

Claims 1-8 and 13-20 are pending and at issue.

Examiner's Response to Applicant's Arguments

In the section entitled "Response to Arguments" in the September 9, 2003 Office Action, the Examiner states that it not clear what is meant by "an example of [a] welding Cu is tin" (See Office Action, page 3, last paragraph). Applicants note that the "welding Cu material" recited in the pending claims refers to a copper material which includes a tertiary metal (such as tin) (see page 6, lines 20-22 of the specification). The tertiary metal in the welding Cu material facilitates welding at temperatures below the two-element eutectic temperature between Ti and Cu. In the present invention, such welding occurs in a one-step process, as opposed to first coating the Ti material, and subsequently welding Cu to the coated Ti material as taught by Smith.

Claim Rejections - 35 U.S.C. § 103

Claims 1, 3-8, and 13-15 stand rejected under 35 U.S.C. § 103(a) as obvious over Smith (U.S. Pat. No. 3,991,929).

Smith teaches a method of making a composite by coating a sheath of titanium, zirconium, or tantalum (or an alloy of one of these metals) with a tinning material or alloy *and then soldering* the coated sheath to a metal article, such as copper or aluminum. See the abstract of Smith. In contrast, the presently claimed process does not require (1) any coating steps, or (2) separate coating and soldering steps as taught by Smith. Furthermore, Smith does not teach *interposing* a welding Cu material, which includes a tertiary metal, between a Ti material and a Cu material as in the presently claimed process.

The presently claimed one-step welding process is advantageous over prior art multi-step process. For example, in a multi-step welding process, the Ti material might be exposed to the atmosphere between or during one or more of the steps. Exposure of the Ti material to the atmosphere results in the formation of a strong thin oxide film on its surface. This oxide film decreases the wettability of the Ti material, and is difficult to remove (see page 2, lines 1-8, of the specification). As a result, the Ti material is often processed in a specially controlled environment to minimize its oxidation (see page 8, lines 11-15, of the specification). The more steps required to be performed on the Ti material, the greater the likelihood that the material will be exposed to the atmosphere and/or the more costly the processing. The presently claimed one-step welding process is more efficient than the multi-step process described in Smith.

For the foregoing reasons, applicants respectfully request withdrawal of this rejection.

Claim 2 stands rejected as obvious over Smith in view of Kline (U.S. Patent No. 4,411,762).

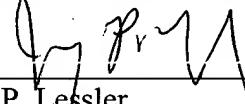
Kline does not teach *interposing* a welding Cu material, including a tertiary metal as a component, between a Ti material and a Cu material. Whereas the present invention welds Ti and Cu using heat, the metal coating in Kline is formed by electrolyte electrodeposition techniques. See the abstract of Kline.

Therefore, Smith alone or in combination with Kline fails to render obvious the presently claimed invention. Accordingly, applicants respectfully request withdrawal of this rejection.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

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Respectfully submitted,

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